-6/28/01

L12 ANSWER 1 OF 1 INSPEC COPYRIGHT 2001 IEE

AN 1990:3597885 INSPEC DN A90054113

TI Al-La-Ni amorphous alloys with a wide **supercooled liquid** region.

AU Inoue, A. (Inst. for Mater. Res., Tohoku Univ., Sendai, Japan); Zhang, T.; Masumoto, T.

SO Materials Transactions, JIM (Dec. 1989) vol.30, no.12, p.**965**-72.
11 refs.
CODEN: TJIMAA ISSN: 0021-4434

DT Journal

TC Experimental

CY Japan

LA English

AB Amorphous alloys exhibiting a wide supercooled liquid region and a high reduced glass transition temperature (Tg/Tm) were found to be formed over a compositional range from 3 to 83 at.% La and 0 to 60% Ni in Al-La-Ni system by melt spinning. The temperature span Delta Tx(=Tx-Tg) between Tg and crystallization temperature (Tx) reaches as large as 69 K for Al25La55Ni20. The Tg/Tm is also as high as 0.68 for Al25La55Ni20 and the Al-La-Ni alloys are concluded to have a high glass-forming ability. The Tx and hardness (Hv) increase with increasing Al and Ni contents in the range from 425 K to 750 K and 170 to 520 and the tensile strength also has a similar compositional dependence in the range of 515 to 795 MPa. The compositional effect on Tx and Hv was presumed to originate from the variation of the atomic configuration which reflects the compounds of La3(Al,Ni), La(Al,Ni) and La(Al,Ni). The high stability of the supercooled liquid in the vicinity of the stoichiometric composition Al1La2Ni1 against the transformation of crystalline phases, i.e., large Delta Tx and high Tg/Tm, seems to result from an optimum bonding state of the constituent atoms for the stoichiometric alloy.

CC A6140D Glasses; A6470P Glass transitions; A8140N Fatigue, embrittlement, and fracture; A6220M Fatigue, brittleness, fracture, and cracks; A8120G Specific metals and alloys (compacts, pseudoalloys); A8130F Solidification; A8140G Other heat and thermomechanical treatments; A6470D Solid-liquid transitions; A6480E Stoichiometry and homogeneity

CT ALUMINIUM ALLOYS; CRYSTALLISATION; GLASS TRANSITION (GLASSES); HARDNESS; LANTHANUM ALLOYS; MELT SPINNING; METALLIC GLASSES; NICKEL ALLOYS; QUENCHING (THERMAL); RAPID SOLIDIFICATION; STOICHIOMETRY; SUPERCOOLING; TENSILE STRENGTH; THERMAL ANALYSIS; YIELD STRENGTH

ST atomic configuration variation; metallic glasses; crystalline phases transformation; thermal stability; liquid quenched; DSC; yield strength; rapid solidification; amorphous alloys; supercooled liquid region; glass transition temperature; melt spinning; crystallization temperature; glass-forming ability; hardness; tensile strength; bonding state; constituent atoms; 515 to 795 MPa; 425 to 750 K; Al25La55Ni20; stoichiometric composition Al1La2Ni1

CHI Al25La55Ni20 ss, Al25 ss, La55 ss, Ni20 ss, Al ss, La ss, Ni ss; Al1La2Ni1 ss, Al1 ss, La2 ss, Ni1 ss, Al ss, La ss, Ni ss

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L9 ANSWER 1 OF 1 HCAPLUS

AN **1990:163209** HCAPLUS

DN 112:163209

TI Aluminum-lanthanum-nickel amorphous alloys with a wide supercooled liquid region

AU Inoue, Akihisa; Zhang, Tao; Masumoto, Tsuyoshi

CS Inst. Mater. Res., Tohoku Univ., Sendai, 980, Japan

SO Mater. Trans., JIM (1989), 30(12), 965-72

CODEN: MTJIEY

DT Journal

LA English

AB Amorphous alloys exhibiting a wide supercooled liq. region and a high reduced glass transition temp. (Tg/Tm) were formed over a compositional range of 3-83 La and 0-60at.% Ni in Al-La-Ni system by melt spinning. The temp. span .DELTA.Tx(=Tx - Tg) between Tg and crystn. temp. (Tx) reaches 69 K for Al25La55Ni20. The Tg/Tm is 0.68 for Al25La55Ni20 and the Al-La-Ni alloys are concluded to have a high glass-forming ability. The Tx and Vickers hardness (Hv) increase with increasing Al and Ni contents at 425 K-750 K and 170-520, resp., and the tensile strength also has a similar compositional dependence at 515-795 MPa. The compositional effect on Tx and Hv originated from the variation of the at. configuration which reflects the compds. of La3(Al,Ni), La(Al,Ni), and La(Al,Ni)2. The high stability of the supercooled liq. in the vicinity of the stoichiometric compn. Al1La2Ni1 against the transformation of cryst. phases, i.e., large .DELTA.Tx and high Tg/Tm results from an optimum bonding state of the constituent atoms for the stoichiometric alloy.

6/28/01

L11 ANSWER 1 OF 2 COMPENDEX COPYRIGHT 2001 EI
AN 2000(16):2791 COMPENDEX
TI Microforming of **MEMS** parts with amorphous alloys.
AU Saotome, Yasunori (Gunma Univ, Gunma, Jpn); Zhang, Tao; Inoue, Akihisa
MT Proceedings of the 1998 MRS Fall Meeting - Symposium MM on'Bulk Metallic Glasses'.
MO Alps Electric Co., Ltd.; Amorphous Technologies International; JEOL Ltd.; Oak Ridge National Laboratory; U.S.Department of Energy
ML Boston, MA, USA
MD 01 Dec 1998-03 Dec 1998
SO Materials Research Society Symposium - Proceedings v **554** 1999.p 385-390
CODEN: **MRSPDH** ISSN: 0272-9172
PY 1999
MN 56265
DT Journal
TC Experimental
LA English
AB Microformability of new amorphous alloys in the supercooled liquid state and microforming techniques for the materials are shown.In the supercooled liquid state, the materials reveal perfect Newtonian viscous flow characteristics and furthermore exhibit an excellent property of microformability on a submicron scale.As for microforming techniques, microforging and micro extrusion of amorphous alloys are introduced in addition to the fabrication method of micro dies of photochemically machinable glass.As a result, amorphous alloys are expected as one of the most useful materials to fabricate micromachines.(Author abstract) 13 Refs.
CC 531 Metallurgy and Metallography; 933.2 Amorphous Solids; 604.2 Machining Operations; 641.2 Heat Transfer; 531.1 Metallurgy; 704.1 Electric Components
CT *Metallic glass; Newtonian flow; Liquid metals; Microelectromechanical devices; Viscous flow; Metal extrusion; Photochemical forming; Amorphous alloys; Micromachining; Supercooling
ST Microforming techniques; Supercooled liquids; Micro dies

6/28/01

L4 ANSWER 2 OF 2 HCAPLUS COPYRIGHT 2001 ACS
AN 1999:735816 HCAPLUS
DN 132:67435
TI Microforming of **MEMS** parts with amorphous alloys
AU Saotome, Yasunori; Zhang, Tao; Inoue, Akihisa
CS Dept of Mechanical Eng., Gunma University, Gunma, 376-8515, Japan
SO Mater. Res. Soc. Symp. Proc. (**1999**), **554**(**Bulk Metallic** Glasses), 385-390
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
CC 56-11 (Nonferrous Metals and Alloys)
AB Microformability of new amorphous alloys in the supercooled liq. state and microforming techniques for the materials are shown for the manuf. of micro-electro-mech. systems (**MEMS**). In the supercooled liq. state, the materials reveal perfect Newtonian viscous flow characteristics and furthermore exhibit an excellent property of microformability on a submicron scale. As for microforming techniques, micro-forging and micro-extrusion of amorphous alloys are introduced in addn. to the fabrication method of micro dies of photochem. machinable glass. As a result, amorphous alloys are expected as one of the most useful materials to fabricate micromachines.
ST metallic glass micromachining microelectromech device; zirconium amorphous alloy micromachining microelectromech device
IT Flow
(Newtonian viscous; in microforming of of metallic glasses for micro-electro-mech. system parts)
IT Extrusion of metals
Forging
(micro-; microforming of of metallic glasses for micro-electro-mech. system parts)
IT Micromachines
(microforming of of metallic glasses for micro-electro-mech. system parts)
IT Metallic glasses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(zirconium alloy; microforming of of metallic glasses for micro-electro-mech. system parts)
IT 170474-37-0, Aluminum 10, copper 30, nickel 5, zirconium 55 atomic
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(microforming of of metallic glasses for micro-electro-mech. system parts)
RE.CNT 13
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